

REMARKS

This application has been carefully reviewed in light of the Office Action dated July 8, 2003. Claims 26, 32, 71 and 72 have been amended. Claims 73-76 have been added. Claims 26-35 and 71-76 are now pending. Applicant respectfully requests reconsideration of the above-referenced application in light of the amendments and following remarks.

Claims 26, 71 and 72 stand rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. Applicant respectfully disagrees. Nonetheless, claims 26, 71 and 72 have been amended to overcome the Examiner's objections. Claim 26 recites, "a flowing plasma etchant mixture consisting essentially of at least one fluorocarbon and ammonia." (emphasis added). Claims 71 and 72 similarly recite "a flowing plasma etchant mixture consisting of at least one fluorocarbon and ammonia." (emphasis added). Support is found in Applicant's specification on page 5, lines 12-14. Accordingly, Applicant respectfully requests that all § 112, first paragraph rejections be withdrawn.

Claims 26-29, 32 and 72 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Levinstein. Reconsideration is respectfully requested.

Applicant respectfully submits that Levinstein fails to anticipate the present invention. Levinstein does not teach "a flowing plasma etchant mixture consisting essentially of at least one fluorocarbon and ammonia, wherein said ammonia has a flow rate that is from about 2 sccm to about 6 sccm," as recited in claim 26 or a "a flowing plasma etchant mixture consisting of at least one fluorocarbon and ammonia under an operating temperature of from about -50°C to about 80°C, wherein said ammonia has a flow rate that is from about 2 sccm to about 6 sccm," as recited in claim 72.

Levinstein merely teaches that other "anisotropic reaction ion etchants of silicon dioxide can be used, such as a mixture of CHF₃ and NH₃, or of CHF₃ and O₂, or of CHF₃ and CO₂." (Col. 6, lines 35-37). Levinstein does not teach that the "ammonia has a flow

rate that is from about 2 sccm to about 6 sccm,” as recited in claims 26 and 72. Further, Levinstein does not teach a “flowing plasma etchant mixture consisting of at least one fluorocarbon and ammonia under an operating temperature of from about -50°C to about 80°C,” as recited in claim 72.

Claims 27-29 and 32 depend from and incorporate all of the limitations recited in independent claim 26. For at least the reasons given above with regard to claim 26, claims 27-29 and 32 are similarly allowable along with claim 26. Accordingly, Applicant respectfully requests that all § 102(b) rejections be withdrawn.

Claims 30 and 31 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Levinstein in view of Becker. Reconsideration is respectfully requested.

Claims 30 and 31 depend from and incorporate all of the limitations recited in independent claim 26. For at least the reasons given above with regard to claim 26, claims 30 and 31 are similarly allowable along with claim 26. In particular, Levinstein does not teach or suggest “a flowing plasma etchant mixture consisting essentially of at least one fluorocarbon and ammonia, wherein said ammonia has a flow rate that is from about 2 sccm to about 6 sccm,” as recited in claim 26. Becker is relied upon for teaching the combination of etchant materials to meet specific limits that would not violate alignment tolerances or design rules, and adds nothing to rectify the deficiencies associated with Levinstein.

Applicant also respectfully submits that there is no motivation to combine the references. Becker teaches a four-etchant composition: “CHF₃, CF₄, AR, and a CH₂F₂ additive material.” (Col. 2, lines 24-25). Levinstein teaches a two-etchant composition: “CHF₃ and NH₃.” (Col. 6, lines 35-37). Becker’s four-etchant composition relies on the presence of a silicon nitride layer i.e., an etch-stop layer (See Col. 6, lines 16-20). In Levinstein, there is no silicon nitride layer. Accordingly, there is no motivation to employ Becker’s CH₂F₂ additive material.

Moreover, the references are directed to solving different problems. Becker teaches "using increased temperatures to achieve increased [etch] selectivity," (Col. 2, lines 55-57). In contrast, Levinstein is directed to an insulating layer that is "either a phosphorus-rich or a phosphorus-poor (less than about 6 percent phosphorus by weight) silicon dioxide glass layer, and the second layer is a phosphorus-poor silicon dioxide layer. In this way, the undesired propagation of cracks is contained within the first insulating layer," when forming a semiconductor MOS device with two different levels of metallization (Col. 2, lines 29-34). There is no motivation in Levinstein to increase etch selectivity of the aperture and therefore, there is no motivation to combine the references.

Still further, even if the references are properly combinable, one still would not obtain the invention as claimed in dependent claims 31 and 32, which incorporate all of the limitations found in independent claim 26. In particular, the cited references would still fail to teach or suggest a flowing plasma etchant mixture consisting essentially of at least one fluorocarbon and ammonia, "wherein said fluorocarbon is a combination of CF_4 , CHF_3 and CH_2F_2 ," as recited in claim 31 (emphasis added), or that "the composition is ineffective to remove side wall spacers of a gate stack," as recited in claim 32 (emphasis added). Levinstein and Becker do not teach or suggest a composition that does not remove the sidewall spacers of a gate stack. In fact, neither reference addresses this important feature claimed by the Applicant. Accordingly, Applicant respectfully requests that all § 103(a) rejections be withdrawn.

Claims 33-35 and 71 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Levinstein in view of Hamrah. Reconsideration is respectfully requested.

Claims 33-35 depend from and incorporate all of the limitations recited in independent claim 26. For at least the reasons given above with regard to claim 26, claims 33-35 are similarly allowable along with claim 26. In particular, Levinstein does not teach or suggest "a flowing plasma etchant mixture consisting essentially of at least one

fluorocarbon and ammonia, wherein said ammonia has a flow rate that is from about 2 sccm to about 6 sccm,” as recited in 26. Hamrah is relied upon for teaching the flow rate ratio of 30:7 and adds nothing to rectify the deficiencies associated with Levinstein.

Hamrah merely teaches that the ammonia has a flow rate of 7 sccm (page 9, lines 2-5). Hamrah does not teach or suggest that the “ammonia has a flow rate that is from about 2 sccm to about 6 sccm,” as recited in claim 26.

Claim 71 recites a “flowing plasma etchant mixture consisting of at least one fluorocarbon and ammonia under an operating pressure of from about 30 to about 60 milliTorr, wherein the flow rate ratio of said at least one fluorocarbon to said ammonia is from about 2:1 to about 40:1.” (emphasis added). The cited references do not teach or suggest Applicant’s claimed operating pressure for a composition.

Moreover, there is no motivation to combine the cited references. Hamrah teaches an etchant mixture for increasing the oxide etch rate while suppressing the polysilicon etch rate (See Page 2, lines 33-34). Levinstein is directed to providing a phosphorus-rich or a phosphorus-poor insulating layer to avoid cracks and fissures in the aperture of a semiconductor device. Accordingly, Applicant respectfully requests that all § 103(a) rejections be withdrawn.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

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Respectfully submitted,

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